

Overview

A significant reason to engage in gardening in schools is to teach students, and allow them to discover for themselves, how plants grow and what part of the plant we eat. That is the purpose of this activity.

Background

Students are no longer aware of the source of their food. Surprisingly, they actually believe that food comes from the grocery store. As if machinery in the back of the store is manufacturing the foods they eat every day. Of course, much of the foods consumed today are processed into forms unrecognizable from their plant or animal origins. While most adults recognize that foods are grown on farms from plants or raised as domesticated animals, they would also be at a loss to answer the questions posed in this lesson.

Is it a root? Is it a stem? Is it a leaf? Is it a fruit? Is it actually a vegetable? We have practically and informally classified plant products by how they are consumed. If it is served with the main entrée in a meal we have considered it a vegetable. If it is sweet or served as dessert, we have considered it a fruit. Actually, there is a scientific botanical designation of fruits. In laymen's terms, if it has a seed or is a seed it is, botanically, the fruit of the plant. So, grains are plant fruits. Tomatoes are plant fruits. Cucumbers, squash, and pumpkins are all plant fruits.

So, what are vegetables? Vegetables are the vegetative part of the plant and the reproductive part of the plant before they bloom and set fruit and seed.

Vegetables are:

Leaves: Lettuce, Cabbage, Spinach, Bay leaves, Oregano, Sage, Parsley Flakes, Basil,

Rosmary, Thyme, Tea, Dillweed, Cilantro, Mints

Modified Leaves: Onions, Celery, Brussel Sprouts, Garlic

Flowers: Broccoli, Cauliflower, Artichoke, Cloves, Saffron

Stems: Cinnamon, Asparagus

Modified Stems: Potatoes, Turnips, Ginger

Roots: Carrots, Beets, Parsnips, Sweet Potatoes, Radish, Tumeric

Botanical Fruits are:

Commonly Considered Vegetables but Botanically Fruits: Tomatoes, Cucumbers, Peppers, Squash, Pumpkins, Beans, Sweet Corn, Peas, Snow Peas

Commonly Considered Fruits and Botanically Fruits: Apples, Cherries, Peaches, Plums, Watermelons, Cantaloupes, Bananas, Oranges, Lemons, Limes, Mangoes, Strawberries, Blueberries, Raspberries, Gooseberries, Grapes, Currents, Dates, Figs

Commonly Considered Nuts but Botanically Fruits: Almonds, Black Walnuts, Brazil Nuts, Cashews, Coconuts, Hazel Nuts, Hickory Nuts, Peanuts, Pecans, Walnuts

Commonly Considered Grains but Botanically Fruits: Corn, Wheat, Oats, Sorghum, Barley

Commonly Considered Spices but Botanically Fruits: Allspice, Chili Powder, Caraway, Cardamom, Coriander, Dill Seed, Mace, Mustard, Nutmeg, Paprika, Pepper, Vanilla

Of course, it isn't always so simple. Some plants use both the fruit and vegetative portions of a plant. This is true with dill. The leaves are used as dill weed, and the immature flower heads are used as a flavoring in dill pickles; these are vegetative. The dill seed (fruit) are also used in making dill pickles and as a spice. The leaves of the cilantro plant are used in Mexican

**Time:**

Groundwork: 20 minutes

Exploration: 45 minutes setup, two 30-45 minute-periods to conduct

Making connections: Ongoing

Materials:

- Either a variety of plants from the garden or plant part models
- Copies of the Plant Part diagram
- Copies of the Venn Diagram Labels
- Copies of the student handout What Do We Eat?
- Materials to make the Venn Diagram (Markers and large sheets of paper or bulky yarn to make the Venn Diagram on the classroom floor)

Standards At-A-Glance**Florida Standards Met:**

SC.K.L.14.3, SC.K.N.1.3, SC.1.N.1.3, SC.1.L.14.2, SC.2.N.1.1, SC.3.L.14.1, SC.3.N.1.3, SC.4.L.16.1, SC.4.L.17.2, HE.3.B.1.1, HE.4.B.1.2, LAFS.K.SL.1.3, LAFS.K.SL.2.4, LAFS.1.SL.1.2, LAFS.1.SL.1.3, LAFS.1.SL.2.4, LAFS.2.SL.1.2, LAFS.3.SL.1.2, LAFS.4.SL.1.2, LAFS.5.SL.1.1, LAFS.5.SL.2.4, LAFS.K.L.3.5, LAFS.1.L.3.5, MAFS.K.MD.1.1, MAFS.K.MD.2.3, MAFS.K.G.1.1, MAFS.1.MD.3.4

Next Generation Science Standards:

2-PS1-1, 2-LS4-1, K-2-ETS1-2, 3-LS4-2, 4-LS1-1, 5-PS1-3, 5-PS3-1



Of course, much of the foods consumed today are processed into forms unrecognizable from their plant or animal origins.

"Activity: What Are We Eating?"

cooking as an herb (vegetative), but when the plant develops seed (fruit), it is used as a spice and known as coriander. And politics or the law sometimes intervenes.

In 1983, the Supreme Court ruled that tomatoes should be considered a vegetable for tax purposes. The U.S. Congress passed the Tariff Act of 1883 which imposed a 10 percent tariff on all imported vegetables. So, the tax collector in New York harbor was collecting tax on tomatoes as a vegetable. Fruit importers, the Nix brothers, sued to retrieve back taxes claiming that tomatoes should be considered fruit and therefore not taxed. The court denied the claim and tomatoes were legally determined to be vegetables regardless of science. Tax is still paid today on imported tomatoes. This lesson will be straightforward in most applications and will only explore the more confusing aspects of this topic as an enhancement.

Groundwork

Objective: To determine student understanding of plant anatomy and associated foods.

1. Find out what your students already know about where their foods come from by asking such questions as: "Which foods that you eat come from plants? Which foods come from animals?"
2. Have the students list their favorite foods that they believe come from plants and explore the ingredients. This may be done by reading ingredient labels, researching on-line or in the library.
3. Review the parts of the plant and the process of plant growth and reproduction using the plant diagram included.
4. After the food sources are identified, determine the parts of the plant that are used to make up that food. Generalities are fine at this point.

Exploration

Objective: To identify if the food is actually a fruit or vegetable and the part of the plant consumed as food.



Fruit or Vegetable?

1. Have students make a list of as many fruits and vegetables as they can think of. Post the list where students can see it.
2. Make signs for each fruit and vegetable with letters two-to-three inches tall to be seen from a distance, or have students find pictures of each fruit or vegetable from seed catalogs, magazines, grocery store fliers, or online.
3. Explain the difference between a fruit and vegetable, as described above, in both common usage and scientific usage.
4. On a bulletin board, with paper and marker, or on the floor, using heavy yarn, make a Venn diagram of three circles. Use the three headings; Fruit Common Use, Fruit Scientific and Vegetable Common Use to label the two independent portions of the circle and interlocking portions as seen in the graphic on page 94.
5. Select the first item listed and ask: Would this be called a fruit or vegetable in common usage? Place either the picture or word in the portion of the circle labeled appropriately. Continue placing all fruits and vegetables in one category or the other, avoiding the scientific intersection.
6. Look at all the items placed as fruits and ask if they would qualify as fruits scientifically (botanically), as well as in common usage. Most commonly known fruits would be listed in both categories. The exception would be rhubarb (actually a vegetable). Once all fruits are correct, add the label '& Scientific' underneath the 'Fruit Common Use' Label.

- Turn to those items placed in the vegetable category and one at a time, ask: "Is it a fruit or vegetable using the scientific definition? (Is it a seed or does it have a seed?)" Move those vegetables that are actually fruits botanically to the area of the overlapping circles. Continue through the end of the list. Once all vegetables are in the correct space, add the '& Scientific' underneath the 'Vegetable Common Use' Label.
- Discuss how many vegetables are actually botanically fruit and any surprises that may have arisen.

What part of the plant?

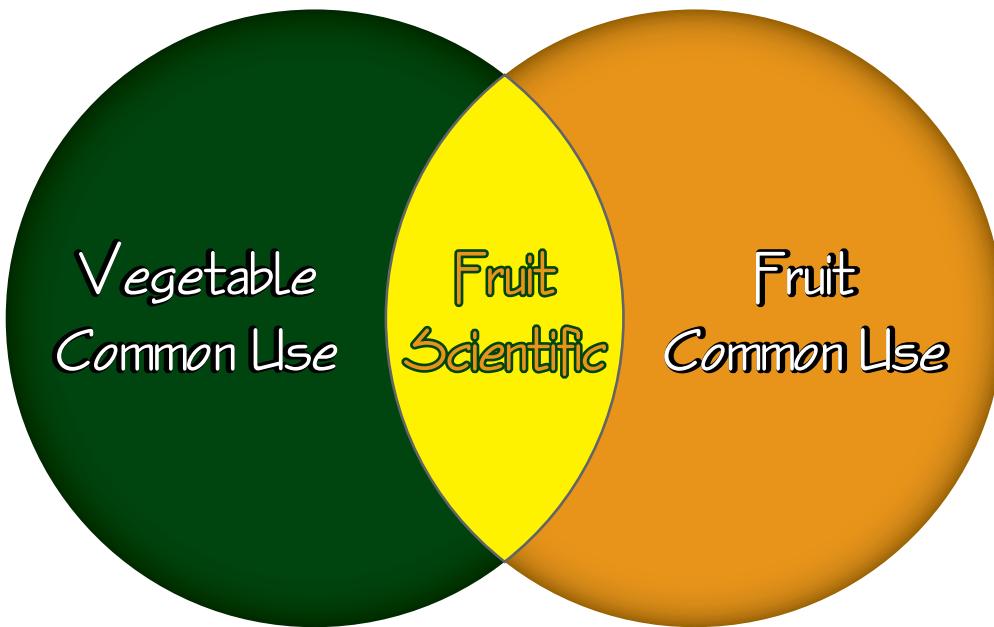
- Create a chart in a visible location with the headings: Food, Leaf/Leaves, Flowers, Stems, Roots (for younger students) or Food, Leaf/Leaves, Modified Leaves, Flowers, Stems, Modified Stems, Roots (for older students) and provide copies of the handouts (pages 95 and 96) for student use either to take notes or with a group activity.
- Using only the plant foods identified in the previous activity as true vegetables, have the students categorize each vegetable on the list into one of these categories. This may be done in small groups or as a class.
- For the challenging items (modified leaves and stems), have the students either dissect the real vegetables or research the information on the Internet. Identifying onions as modified leaves is easily seen with scallions or green onions. Celery, when stripped off the bunch, will reveal the stem at the center of the plant and that the celery stalk is the leaf petiole.

Extensions for Middle and High School students

- Use the lesson specifically developed for teaching biology to middle school and high school students "What Part of the Plant Do We Eat?" at: <http://serendip.brynmaur.edu/exchange/waldron/planteaters>.
- Have the students select an herb or spice and research its history, origin, and uses, and use the information to write a report, create a PowerPoint presentation, or poster project.

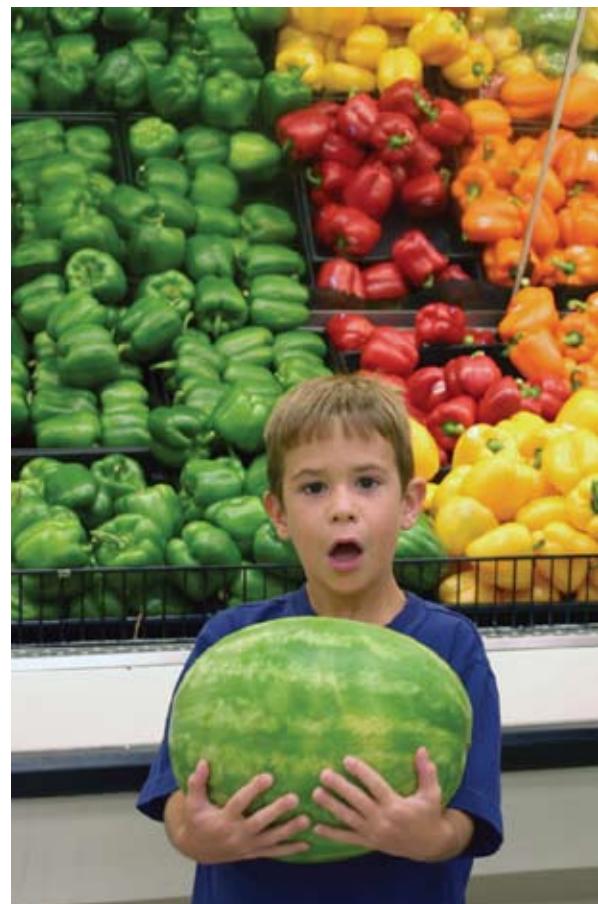
Additional Materials:

- Florida Agriculture in the Classroom, Inc. has K-12 lessons searchable on its website by grade level, subject area and commodity at www.faitc.org.
- Use the lesson "Fruits or Veggies?" from *Project Food, Land & People's Resources for Learning*. It can be obtained by attending a workshop.



Students are no longer aware of the source of their food. Surprisingly, they actually believe that food comes from the grocery store.

"Activity: What Are We Eating?"



Venn Diagram Labels

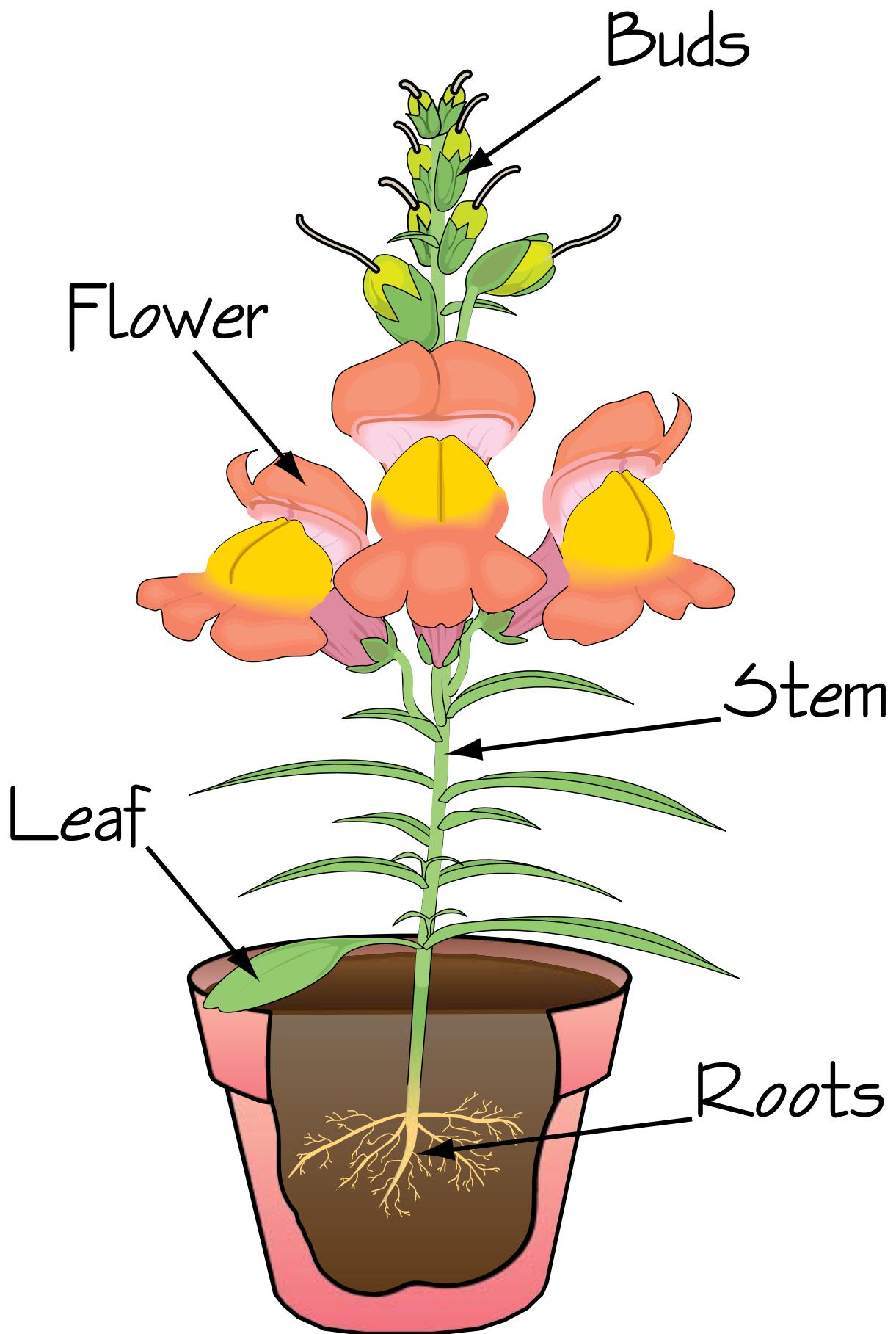
**Fruit
Common Use**

**Fruit
Scientific**

**Vegetable
Common Use**

What Do We Eat?

Name _____



What Are We Eating?

Sample Pre-Post Assessment

1. What is the difference between a fruit and a vegetable?
 2. Which of these are leaves or modified leaves:
 - a. Lettuce, cabbage, celery
 - b. Brussel sprouts, lettuce, asparagus
 - c. Lettuce, Brussel sprouts, potatoes
 - d. Rhubarb, cabbage, asparagus
 3. List two vegetables that are roots.
 4. List three fruits that are commonly known as fruits and scientifically designated fruits.